

## ABSTRACT OF THE INVENTION

An organic self-assembled transistor uses an organic self-assembled monolayer as the active semiconductor layer in which the conducting channel is formed. The monolayer is exposed to the atmosphere; thereby making the voltage characteristics of the transistor, such as mobility and density of charge carriers, very sensitive to vapor molecules. The chemical specificity and strength of interaction of the monolayer is tuned by varying the chemical end group of the organic molecules comprising the monolayer. Varying the chemical end groups allows fabrication of large transistor arrays easily tailored for sensor array or electronic nose applications. The monolayer is also compatible with known low-cost VLSI silicon fabrication processes.

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